



U. S. Department
of Transportation

Office of the Secretary
of Transportation

New Multi-Modal Solicitation
PROGRAM SOLICITATION

**Small Business Innovation
Research Program**

Issue Date: April 15, 2008

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**DOT SBIR Program Office, RTV-1A
U.S. DOT/RITA/VNTSC
55 Broadway
Cambridge, MA 02142-1093**

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DOT PROGRAM SOLICITATION FOR SMALL BUSINESS INNOVATION RESEARCH

I. PROGRAM DESCRIPTION

A. Introduction

This solicitation for research proposals is issued by The United States Department of Transportation (DOT) pursuant to the Small Business Innovation Development Act of 1982, P.L. 97-219 (codified at 15 U.S.C. 638) as amended by the Small Business Innovation Research (SBIR) Program, Extension, P.L. 99-443 which extended the program through September 30, 1993. On October 28, 1992, through the Small Business Innovation Research and Development Act of 1992 (P.L. 102-564), Congress reauthorized and extended the SBIR program for another seven years (2000). Subsequently, on December 21, 2000, through the Small Business Reauthorization Act of 2000 (P.L. 106-554) Congress again reauthorized the SBIR program through September 30, 2008.

The SBIR program encourages small business concerns to engage in research or research and development (R/R&D) that has the potential for commercialization to meet Federal research or research and development objectives.

The purposes of the SBIR program are:

- (1) To stimulate technological innovation;
- (2) To use small business to meet Federal R/R&D needs;
- (3) To increase private sector commercialization of innovations derived from Federal R/R&D; and
- (4) To foster and encourage participation by minority and disadvantaged persons in technological innovation.

In consonance with the statutory obligations of the Act, the DOT has established a Small Business Innovation Research Program —hereinafter referred to as the DOT SBIR Program.

The purpose of this solicitation is to invite small businesses with their valuable resources and creative capabilities to submit innovative research proposals that address high priority requirements of the DOT.

B. Three-Phase Program

The DOT SBIR Program is a three-phase process.

THIS SOLICITATION IS FOR PHASE I PROPOSALS ONLY.

Phase I. Phase I provides support for the conduct of feasibility-related experimental or theoretical research or R/R&D efforts on research topics as described herein. The dollar value of the proposal may be up to \$100,000 unless otherwise noted and the period of performance is generally six months. The basis for award will be the scientific and technical merit of the proposal and its relevance to DOT requirements and priorities. **Only awardees in Phase I are eligible to participate in Phase II which is by invitation only.**

Phase II. Phase II is the principal R/R&D effort having a period of performance of approximately two years with a dollar value of up to \$750,000 unless otherwise noted. DOT will accept Phase II proposals under the DOT SBIR Program only from firms which have previously received a DOT Phase I award. Phase II proposals must be prepared in accordance with guidelines provided by DOT to Phase I awardees receiving an invitation to submit a Phase II proposal. Phase II awards will be based on the results of Phase I efforts, technical merit, agency priority and commercial applications, and the availability of appropriated funds to support the Phase II effort. Special consideration may be given to proposals that have obtained commitments for follow-on funding from non-Federal sources for Phase III.

Phase III. SBIR Phase III award logically follows SBIR Phase II and may be a continuation of the work under Phase II or commercialization of the research under the previous SBIR phases. Like SBIR Phase II, the award process is exempted from FAR subpart 5.2 requirements. Only those vendors who were awarded both a SBIR Phase I and Phase II may receive a SBIR Phase III award. There is no limit on the performance period length or dollar value of a SBIR Phase III, and the small business size limits for Phase I and Phase II awards do not apply to SBIR Phase III awards.

Phase III is to be conducted by the small business with either:

- non-Federal funds to pursue commercial applications of R/R&D funded in Phases I and II, or
- non-SBIR Government funded contracts for continued research or products or processes

intended for use by the United States Government.

C. Eligibility

Each concern submitting a proposal must qualify as a small business at the time of award of Phase I and Phase II contracts. In addition, **the primary employment of the principal investigator must be with the small business firm at the time of contract award and during the conduct of the proposed research** unless otherwise approved by the Contracting Officer. Primary employment means that more than one-half of the principal investigator's time is spent with the small business. Also for both Phase I and Phase II, the R/R&D work must be performed in the United States. "United States" means the 50 states, the Territories and possessions of the United States, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, the Trust Territory of the Pacific Islands, and the District of Columbia.

All types of small business organizations may submit proposals, including high technology, R&D, manufacturing, and service firms. Companies with outstanding scientific or engineering competence in highly specialized product, process or service areas may wish to apply their expertise to the research topics in this solicitation through a laboratory prototype. Ideally, the research should make a significant contribution to the solution of an important transportation problem and provide the small business concern with the basis for new products, processes, or services.

D. General Information

This is a solicitation for Phase I R/R&D proposals on advanced, innovative concepts from small business firms having strong capabilities in applied science or engineering.

The Phase I R/R&D proposals shall demonstrate a sound approach to the investigation of an important transportation-related scientific or engineering problem categorized under one of the topics listed in Section VIII.

A proposal may respond to any of the research topics listed in Section VIII, but must be limited to one topic. The same proposal may not be submitted under more than one topic. An organization may, however, submit separate proposals on different topics, or different proposals on the same topic, under this solicitation. Where similar research is discussed under more than one topic, the offeror shall choose that topic which appears to be most relevant to the offeror's technical concept.

The proposed research must have relevance to the improvement of some aspect of the national transportation system or to the enhancement of the ability of an operating element of the DOT to perform its mission.

Proposals shall be confined principally to scientific or engineering research, which may be carried out through construction and evaluation. Proposals must be for R/R&D, particularly on advanced or innovative concepts, and shall not be for incremental or scaled-up versions of existing equipment or the development of technically proven ideas. Proposals for the development of already proven concepts toward commercialization, or which offer approaches already developed to an advanced prototype stage or for market research shall not be submitted. Commercialization is the objective of Phase III, in which private capital or non-SBIR funds are to be used to continue the innovative research supported by DOT under Phase I and Phase II.

The proposal shall be self-contained and checked carefully by the offeror to ensure that all preparation instructions have been followed.
(See Proposal Checklist, Appendix D).

Requests for additional information or questions relating to the DOT SBIR Program may be addressed to:

Joseph Henebury
DOT SBIR Program Director, RTV-1A
U.S. DOT/RITA/VTSC
55 Broadway
Cambridge, MA 02142-1093

Telephone: (617) 494-2051
Fax: (617) 494-2370
Email Address: henebury@volpe.dot.gov
Volpe Center Website: <http://www.volpe.dot.gov/sbir>

II. DEFINITIONS

A. Research or Research and Development (R/R&D)

R/R&D means any activity which is:

- (1) A systematic, intensive study directed toward greater knowledge or understanding of the subject studied;
- (2) A systematic study directed specifically toward applying new knowledge to meet a recognized need; or
- (3) A systematic application of knowledge toward the production of useful materials, devices, and systems or methods, including design, development, and improvement of prototypes and new processes to meet specific requirements.

B. Small Business Concern

A small business concern is one that at the time of award of Phase I and Phase II contracts meets all of the following criteria:

- (1) Is independently owned and operated, is not dominant in the field of operation in which it is proposing, and has a place of business in the United States and operates primarily within the United States or makes a significant contribution to the U.S. economy, and is organized for profit.
- (2) Is (a) at least 51% owned and controlled by one or more individuals who are citizens of, or permanent resident aliens in, the United States or (b) it must be a for-profit business concern that is at least 51% owned and controlled by another for-profit business concern that is at least 51% owned and controlled by one or more individuals who are citizens of, or permanent resident aliens in, the United States.
- (3) Has, including its affiliates, an average number of employees for the preceding 12 months of less than 500, and meets the other regulatory requirements found in 13 CFR Part 121. Business concerns are generally considered to be affiliates of one another when either directly or indirectly, (a) one concern controls or has the power to control the other; or (b) a third party/parties controls or has the power to control both.

Control can be exercised through common ownership, common management, and contractual relationships. The term "affiliates" is defined in greater detail in 13 CFR 121.103. The term "number of employees" is defined in 13 CFR 121.106.

A business concern may be in the form of an individual proprietorship, partnership, limited liability company, corporation, joint venture, association, trust, or cooperative. Further information may be obtained at <http://www.sba.gov/size>, or by contacting the Small Business Administration's Government Contracting Area Office or Office of Size Standards.

C. Socially and Economically Disadvantaged Small Business Concern

A socially and economically disadvantaged small business concern is one that is at least 51% owned and controlled by one or more socially and economically disadvantaged individuals, or an Indian tribe, including Alaska Native Corporations (ANCs), a Native Hawaiian Organization (NHO), or a Community Development Corporation (CDC). Control includes both strategic planning (as that exercised by boards of directors) and the day-to-day management and administration of business operations. See 13 CFR 124.109, 124.110, and 124.111 for special rules pertaining to concerns owned by Indian Tribes (including ANCs), NHOs, or CDCs, respectively.

D. Women-Owned Small Business Concern

A woman-owned small business concern is one that is at least 51% owned and controlled by a woman or women. Control includes both the strategic planning (as that exercised by boards of directors) and the day-to-day management and administration of business operations.

E. Veteran Owned Small Business

A veteran-owned small business concerns is one that is at least 51 percent owned and controlled by one or more veterans (as defined at 38 U.S.C. 101(2) or, in the case

of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans, and the management and daily business operations of which are controlled by one or more veterans.

F. Subcontract

Subcontract means any agreement, other than one involving an employer-employee relationship, entered into by a Federal Government funding agreement awardee calling for supplies or services required solely for the performance of the original funding agreement.

G. Historically Underutilized Business Zone (HUBZone)

- A HUBZone small business concern is one that meets the following criteria:
 - 1. Located in “historically underutilized business zone” or HUBZone area located in one or more of the following:
 - a) A qualified census tract (as defined in Section 42(d)(5)(i)(I) of the Internal Revenue Code of 1986);
 - b) A qualified “non–metropolitan county” (as defined in Section 143(k)(2)(B) of the Internal Revenue Code of 1986) with a median household income of less than 80% of the state median household income or with an unemployment of not less than 140% of the statewide average based on U.S. Department of Labor recent data; or
 - c) Lands within the boundaries of Federally recognized Indian reservations.
 - 2. Owned and controlled by one or more U.S. citizen(s).
 - 3. At least 35% of its employees must reside in a HUBZone.

III. PROPOSAL PREPARATION INSTRUCTIONS AND REQUIREMENTS

A. Proposal Submission Requirements

- Each proposal shall not exceed 25 pages (regular size type – no smaller than 10 point font size – single or double spaced, standard 8 ½” by 11” pages) including proposal cover sheet, contract pricing proposal, and all enclosures or attachments.
- Proposals must be a PDF file and submitted online
- No duplicate proposals shall be sent by any other means.
- Proposals may only be submitted online, a link to the web form can found here:
<http://www.volpe.dot.gov/sbir/current.html>
Instructions are included on the submission page.
- Proposals must be received no later than 5:00 p.m. EST on June 3, 2008.
- The proposal file name shall contain eight (8) characters—the first three shall be the topic number you are proposing to (i.e., FH3), and the remaining five characters shall be a unique abbreviation of your company’s name.

It will be available to only the team of DOT engineers and/or scientists responsible for evaluating your proposal.

B. **Proposal Cover Sheet**

Complete the Proposal Cover Sheet in Appendix A as Page one of your proposal. All pages shall be numbered consecutively, beginning with the Proposal Cover Sheet.

C. **Project Summary**

Complete the form in Appendix B as Page two of your proposal. The Project Summary shall include a technical abstract with a brief statement of the problem or opportunity, project objectives, and description of the effort. Anticipated results and potential applications of the proposed research shall also be summarized in the space provided. The Project Summary of successful proposals may be published by the DOT and, therefore, shall not contain classified or proprietary information. The technical abstract must be limited to 200 words in the space provided on the Project Summary form.

D. **Technical Content**

Submitted proposals must include the following:

- (1) **Identification and Significance of the Problem or Opportunity.** The specific technical problem or innovative research opportunity addressed and its potential benefit to the national transportation system shall be clearly stated.
- (2) **Phase I Technical Objectives.** State the specific objectives of the Phase I R/R&D effort, including the technical questions it will try to answer to determine the feasibility of the proposed approach.
- (3) **Phase I Work Plan.** Describe the Phase I R/R&D plan. The plan shall indicate what will be done, where it will be done, and how the R/R&D will be managed or directed and carried out. Phase I R/R&D shall address the objectives and the questions cited in (2) above. The methods planned to achieve each objective or task shall be discussed in detail, including the level of effort associated with each task.
- (4) **Related Research or R&D.** Describe significant R/R&D that is directly related to the proposal including any conducted by the project manager/principal investigator or by the proposing firm. Describe how it relates to the proposed effort, and any planned coordination with outside sources. The offeror must persuade reviewers of his or her awareness of key recent R/R&D conducted by others in the specific topic area.
- (5) **Key Personnel and Bibliography of Directly Related Work.** Identify key personnel involved in Phase I including their directly related education, experience, and bibliographic information. Where vitae are extensive, summaries that focus on the most relevant experience or publications are desired and may be necessary to meet proposal page limitations.
- (6) **Relationship with Future Research and Development.**
 - (a) State the anticipated results of the proposed approach if the project is successful (Phase I and Phase II).

- (b) Discuss the significance of the Phase I effort in providing a foundation for Phase II R/R&D effort.
- (7) **Facilities.** Provide a detailed description, availability and location of instrumentation and physical facilities proposed for Phase I.
- (8) **Consultants.** Involvement of consultants in the planning and research stages of the project is permitted. If such involvement is intended, it shall be described in detail.
- (9) **Potential Applications.** Briefly describe:
- (a) Whether and by what means the proposed project appears to have potential commercial application.
 - (b) Whether and by what means the proposed project appears to have potential use by the Federal Government.
- (10) **Similar Proposals or Awards.** Warning — while it is permissible, with proposal notification, to submit identical proposals or proposals containing a significant amount of essentially equivalent work for consideration under numerous Federal program solicitations, it is unlawful to enter into contracts or grants requiring essentially equivalent effort. If there is any question concerning this, it must be disclosed to the soliciting agency or agencies before award.

If a firm elects to submit identical proposals or proposals containing a significant amount of essentially equivalent work under other Federal program solicitations, a statement must be included in each such proposal indicating:

- (a) The name and address of the agencies to which proposals were submitted or from which awards were received;
- (b) Date of proposal submission or date of award;
- (c) Title, number, and date of SBIR Program solicitations under which proposals were submitted or awards received;
- (d) The applicable research topics for each SBIR proposal submitted or award received;
- (e) Titles of research projects; and

- (f) Name and title of Project Manager or Principal Investigator for each proposal submitted or award received.

E. Contract Pricing Proposal

A firm fixed price Phase I Contract Pricing Proposal (Schedule 1) must be submitted in detail as shown in Appendix C. Note: firm fixed price is the type of contract to be used for Phase I SBIR awards. Some cost breakdown items of Appendix C may not apply to the proposed project. If such is the case, there is no need to provide information for each and every item. It is important, however, to provide enough information to allow the DOT to understand how the offeror plans to use the requested funds if the contract is awarded. Phase I contract awards may include profit.

F. Central Contracting Registration (CCR) and Data Universal Numbering System (DUNS) Identification Number

Since October 1, 2003, it is federally mandated that any business wishing to do business with the Federal Government under a Federal Acquisition Regulation (FAR)-based contract must be registered in CCR before being awarded a contract. You can find more information on CCR and the registration process in their handbook, <http://www.ccr.gov/handbook.asp>. You can register online at <http://www.ccr.gov> by clicking on “Start New Registration” if you already have a DUNS number. If you need a DUNS number, you can find instructions at <http://fedgov.dnb.com/webform/displayHomePage.do>

A firm must note its DUNS identification number on Appendix C, Contract Pricing Proposal, Schedule 1. This number is assigned by Dun & Bradstreet, Inc.

G. Prior SBIR Phase II Awards

If the small business concern has received more than 15 Phase II awards in the prior five fiscal years, submit name of awarding agency, date of award, funding agreement number, amount, topic or subtopic title, follow-on agreement amount, source and date of commitment, and current commercialization status for each Phase II. (This required proposal information shall not be counted toward the proposal 25-page count limitation.)

IV. METHOD OF SELECTION AND EVALUATION CRITERIA

A. General

All Phase I and Phase II proposals will be evaluated and judged on a competitive basis. Initially, all proposals will be screened to determine responsiveness to the solicitation. Proposals passing this screening will be evaluated to determine the most promising technical and scientific approaches. Each proposal will be judged on its own merit. The DOT is under no obligation to fund any proposal or any specific number of proposals on a given topic or subtopic. It may elect to fund several or none of the proposed approaches to the same topic or subtopic.

B. Evaluation Criteria

The evaluation process involves the following factors:

- (1) Scientific and technical merit and the feasibility of the proposal's commercial potential, as evidenced by:
 - a) Past record of successful commercialization of SBIR or other research;
 - b) Existence of Phase III funding commitments from private sector or non-SBIR funding sources; and
 - c) Presence of other indicators of the commercial potential of the idea.
- (2) The adequacy of the work plan and approach to achieve specified work tasks and stated objectives of the proposed effort within budgetary constraints and on a timely schedule.
- (3) Qualifications of the proposed principal/key investigator(s) including demonstrated expertise in a disciplinary field related to the particular R/R&D topic that is proposed for investigation.
- (4) Adequacy of supporting staff and facilities, equipment, and data for the successful completion of the proposed R/R&D.

C. Prescreening

Each proposal submission will be examined to determine if it is complete and contains adequate technical and pricing data. Proposals that do not meet the basic requirements of the solicitation will be excluded from further consideration. Each offeror will be notified promptly by email of such action.

D. Schedule

All DOT reviews shall be completed and awards recommended within twelve weeks of the closing date for Phase I proposals.

E. Program Selection

A Proposal Review Panel, chaired by the DOT SBIR Program Director and comprising senior management officials representing the Department's Operating Administrations and the Office of the Secretary, will arrange for review and evaluation of proposals by professionals, in their respective organizations, of all Phase I proposals that meet the requirements of this solicitation. The Proposal Review Panel will review the technical evaluations by the engineers and/or scientists and recommend to the DOT SBIR Program Director the proposals for awards. The DOT SBIR Program Director will announce the awards.

F. Contact with DOT

Contact with DOT relative to this solicitation during the Phase I proposal preparation and evaluation period is restricted for reasons of competitive fairness. Technical questions pertaining to the 2008 DOT SBIR solicitation research topics must be submitted to the DOT SBIR Program Office by e-mail to: henebury@volpe.dot.gov. Technical questions will be researched and answers provided in as timely a manner as possible. Technical questions submitted to the DOT SBIR Program Office during the few weeks prior to the closing date for receipt of Phase I proposals may not be able to be answered before the closing date.

No information on proposal status will be available until the complete list of 2008 Phase I Award Recommendations is posted on the DOT SBIR Program Webpage: <http://www.volpe.dot.gov/sbir>. For planning purposes the notification of 2008 Phase I Award Recommendations is expected to be posted on the DOT SBIR Program Webpage by September 8, 2008. **Phase I proposals which are not included in the September 8th list of 2008 Phase I Award Recommendations will not receive an award.**
NO WRITTEN CORRESPONDENCE

REGARDING PROPOSAL STATUS WILL BE ANSWERED.

After the 2008 Phase I Award Recommendations are posted on the DOT SBIR Program Webpage, a debriefing comprised of the overall comments on the proposal may be provided to the offeror upon request.

Debriefing requests should be submitted to the Contracting Officer by e-mail to:
Orin.D.Cook@volpe.dot.gov, and must include the

offeror's name, address, research topic number, and the proposal identification number assigned on the acknowledgement of receipt card. The identity of the evaluators will not be disclosed.

V. CONSIDERATIONS

A. Awards

It is estimated that during Fiscal Year 2008, DOT will award approximately 16 Phase I contracts with an anticipated potential maximum of 19 awards, depending on actual funding available and the responses from small business firms to the solicited research topics in Section VIII.

All Phase I awards will be firm fixed price contracts and may be up to \$100,000 each unless otherwise noted. Phase II awards anticipate cost-plus-fixed-fee contracts with a value of up to \$750,000 each unless otherwise noted. Phase II awardees will be required to have an acceptable accounting system to receive a cost-plus-fixed-fee contract.

Only recipients of Phase I contracts will be eligible to compete for Phase II awards.

DOT's Operating Administrations contribute to SBIR funding. Each Operating Administration's contribution may be used only to support research of concern to that Operating Administration. For example, funds furnished by the Federal Highway Administration may not support research solely of concern to the National Highway Traffic Safety Administration. Based on anticipated funding levels, there may not be adequate funding within the DOT SBIR Program to support Phase I and/or Phase II awards for research which is solely of concern to the following Operating Administrations: Federal Aviation Administration, Federal Highway Administration, Federal Motor Carrier Safety Administration, Federal Railroad Administration, Federal Transit Administration, National Highway Traffic Safety Administration, Research and Innovative Technology Administration, and Pipeline Hazardous Materials Safety Administration. Phase I and Phase II awards for such research will depend on the actual funding available.

B. Reports

Under Phase I SBIR contracts, three reports will be required, consisting of two interim letter reports, and a comprehensive final report.

C. Payment Schedule

Payments for Phase I contracts will be made in three equal installments upon submission of invoices by the contractor in conjunction with the submission of acceptable reports as described in Paragraph B above.

D. Innovations, Inventions, and Patents

1. **Proprietary Information.** Information contained in unsuccessful proposals will remain the property of the offeror. The Government may, however, retain copies of all proposals. Public release of information in any proposal submitted will be subject to existing statutory and regulatory requirements.

If proprietary information is provided by a offeror in a proposal which constitutes a trade secret, proprietary commercial or financial information, confidential personal information or data affecting national security, it will be treated in confidence, to the extent permitted by law, provided this information is clearly marked by the offeror with the term "confidential proprietary information" and provided the following legend appears on the title page of the proposal:

"For any purpose other than to evaluate the proposal, these data shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed in whole or in part, provided that if a contract is awarded to this offeror as a result of or in connection with the submission of these data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the contract. This restriction does not limit the Government's right to use information contained in the data if obtained from another source without restriction. The data subject to this restriction is contained pages _____ of this proposal."

Any other legend may be unacceptable to the Government and may constitute grounds for return of the proposal without further consideration and without assuming any liability for inadvertent disclosure. The Government will limit dissemination of such information to within official channels.

DOT prefers that offerors avoid inclusion of proprietary data in their proposals. If the inclusion of proprietary data is considered essential for meaningful evaluation of a proposal submission, then such data should be provided on a separate page with a numbering system to key it to the appropriate place in the proposal.

2. **Rights in Data Developed under SBIR Contracts.** Rights in technical data, including software developed under any contract resulting from this solicitation, shall remain with the contractor except that the Government shall have the limited right to use such data for Government purposes and shall not release such data outside

the Government without permission of the contractor for a period of four years from completion of the project from which the data were generated. However, effective at the conclusion of the four-year period, the Government shall retain a royalty-free license for Federal Government use of any technical data delivered under an SBIR contract whether patented or not.

3. **Copyrights.** With prior written permission of the Contracting Officer, the contractor normally may copyright and publish (consistent with appropriate national security considerations, if any) material developed with DOT support. The DOT receives a royalty-free license for the Federal Government and requires that each publication contain an appropriate acknowledgement and disclaimer statement.
4. **Patents.** Small business firms normally may retain the principal worldwide patent rights to any invention developed with Government support. The Government receives a royalty-free license for Federal Government use, reserves the right to require the patent holder to license others in certain circumstances, and requires that anyone exclusively licensed to sell the invention in the United States must normally manufacture it domestically. To the extent authorized by 35 U.S.C. 205, the Government will not make public any information disclosing a Government-supported invention for a two-year period to allow the contractor a reasonable time to pursue a patent.

E. Cost-Sharing

Cost-sharing is permitted for Phase II proposals under the topic areas identified in this solicitation; however, cost-sharing is not required nor will it be a factor in proposal evaluations.

F. Profit or Fee

A profit is allowed on awards to small business concerns under the DOT SBIR Program.

G. Joint Ventures or Limited Partnerships

Joint ventures and limited partnerships are permitted provided the entity created qualifies as a small business concern in accordance with the Small Business Act, 15 U.S.C. 631, and the definition included in this solicitation.

H. Research and Analytical Work

1. **For Phase I, a minimum of two-thirds of the research and/or analytical effort must be performed by the proposing firm** unless otherwise approved in writing by the Contracting Officer.
2. **For Phase II, a minimum of one-half of the research and/or analytical effort must be performed by the proposing firm** unless otherwise approved in writing by the Contracting Officer.

I. Contractor Commitments

Upon award of a contract, the awardee will be required to make certain legal commitments through acceptance of numerous contract clauses. The outline that follows is illustrative of the types of clauses to which the contractor would be committed. This list shall not be understood to represent a complete list of clauses to be included in Phase I contracts, nor to be the specific wording of such clauses. A complete copy of the terms and conditions will be provided upon issuance of the model contract for signature prior to award.

1. **Standards of Work.** Work performed under the contract must conform to high professional standards.
2. **Inspection.** Work performed under the contract is subject to Government inspection and evaluation at all times.
3. **Examination of Records.** The Comptroller General (or a duly authorized representative) shall have the right to examine any directly pertinent records of the contractor involving transactions related to this contract.
4. **Default.** The Government may terminate the contract if the contractor fails to perform the work contracted.
5. **Termination for Convenience.** The contract may be terminated at any time by the Government if it deems termination to be in its best interest, in which case the contractor will be compensated for work performed and for reasonable termination costs.
6. **Disputes.** Any dispute concerning the contract which cannot be resolved by agreement shall be decided by the Contracting Officer with right of appeal.

7. **Contract Work Hours.** The contractor may not require an employee to work more than eight hours a day or 40 hours a week unless the employee is compensated accordingly (i.e., overtime pay).
 8. **Equal Opportunity.** The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin.
 9. **Affirmative Action for Veterans.** The contractor will not discriminate against any employee or applicant for employment because he or she is a disabled veteran or veteran of the Vietnam era.
 10. **Affirmative Action for Handicapped.** The contractor will not discriminate against any employee or applicant for employment because he or she is physically or mentally handicapped.
 11. **Officials Not to Benefit.** No member of or delegate to Congress shall benefit from the contract.
 12. **Covenant Against Contingent Fees.** No person or agency has been employed to solicit or secure the contract upon an understanding for compensation except bonafide employees or commercial agencies maintained by the contractor for the purpose of securing business.
 13. **Gratuities.** The contract may be terminated by the Government if any gratuities have been offered to any representative of the Government to secure the contract.
 14. **Patent Infringement.** The contractor shall report each notice or claim of patent infringement based on the performance of the contract.
 15. **Procurement Integrity.** Submission of a proposal under this solicitation subjects the offeror to the procurement integrity provision (§27) of the Office of Federal Procurement Policy Act (41 U.S.C. 423). This statute, as implemented by Federal Acquisition Regulation (FAR, 48 CFR) §3.104, prescribes the following conduct by competing contractors during an agency procurement: offering or discussing future employment or business opportunities with an agency procurement official; promising or offering a gratuity to an agency procurement official; and/or soliciting or obtaining proprietary or source selection information regarding the procurement. Violations of the statute may result in criminal and/or civil penalties, disqualification of a offeror, cancellation of the procurement, or other appropriate remedy.
 16. **Section 508 Access Board Standards.** All electronic and information technology deliverables rendered must comply with Section 508 of the Rehabilitation Act and the Access Board Standards available for viewing at <http://www.section508.gov>. Unless otherwise indicated, the contractor represents by signature on a contract that all deliverables will comply with the Access Board Standards.
- J. Additional Information**
1. This solicitation is intended for informational purposes and reflects current planning. If there is any inconsistency between the information contained herein and the terms of any resulting SBIR contract, the terms of the contract are controlling.
 2. Before award of an SBIR contract, the offeror shall complete Online Representations and Certifications Application: <https://orca.bpn.gov>
 3. The Government may request the offeror to submit additional management, personnel, and financial information to assure responsibility of the offeror.
 4. The Government is not responsible for any monies expended by the offeror before award of any contract.
 5. This solicitation is not an offer by the Government and does not obligate the Government to make any specific number of awards. Also, awards under this program are contingent upon the availability of funds.
 6. The DOT SBIR Program is not a substitute for existing unsolicited proposal mechanisms. Unsolicited proposals shall not be accepted under the DOT SBIR Program in either Phase I or Phase II. See <http://www.volpe.dot.gov/procure/unsolguide.html> for specifics on unsolicited proposal submission requirements.
 7. If an award is made pursuant to a proposal submitted under this solicitation, the contractor will be required to certify that he or she has not previously been, nor is currently being paid for essentially equivalent work by any agency of the Federal Government.
 8. When purchasing equipment or a product with funds provided under the DOT SBIR Program,

purchase only American made equipment and products, to the extent possible in keeping with the overall purposes of the program.

9. In accordance with FAR 52.233-2, Service of Protest, the following Service of Protest procedures shall be followed. Protests, as defined in Section 33.101 of the FAR that are filed directly with an

agency, and copies of any protests that are filed with the Government Accountability Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgement of receipt from: Orin Cook, DOT/RITA/Volpe Center, 55 Broadway, RTV-6D1, Cambridge, MA 02142-1093

VI. SCIENTIFIC AND TECHNICAL INFORMATION SOURCES

The following organizations may be sources for providing technology search and/or document services and may be contacted directly for service and cost information:

Center for Technology Commercialization
1400 Computer Drive
Westborough, MA 01581
(508) 870-0042

Federal Information Exchange, Inc.
555 Quince Orchard Road, Suite 360
Gaithersburg, MD 20878
(301) 975-0103

Midcontinent Technology Transfer Center
Texas Engineering Extension Service
The Texas A&M University System
301 Tarrow Street, Suite 119
College Station, TX 77840-7896
(409) 845-8762

MidAtlantic Technology Applications Center
University of Pittsburgh
3400 Forbes Avenue, 5th Floor
Pittsburgh, PA 15260
(412) 383-2500

Great Lakes Industrial Technology Center
25000 Great Northern Corporation Center, Suite 260
Cleveland, OH 44070-5320
(440) 734-0094

Southern Technology Applications Center
University of Florida
1900 SW 34th Street, Suite 206
Gainesville, FL 32608
(352) 294-7822

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
(800) 553-6847

Technology Transfer Center
University of Southern California
3716 South Hope Street, Suite 200
Los Angeles, CA 90007-4344
(213) 743-2352

VII. RESEARCH TOPICS

Multi-modal topics are highlighted in green and marked with an asterisk*

Phase I research topics for DOT Operating Administrations are listed below. These topics indicate the specific areas for which proposals are to be considered for acceptance by DOT. The topics are not listed in any order of priority. Each proposal must respond to one (and only one) topic as described in this section. A proposal may, however, indicate and describe its relevance to other topics.

DOT OPERATING ADMINISTRATION/TOPIC	POTENTIAL MAXIMUM FY08.1 AWARDS	PHASE I
FEDERAL HIGHWAY ADMINISTRATION		6 AWARDS
081-FH1 Balancing Safety and Capacity in an Adaptive Traffic Signal Control System		
081-FH2 High Efficiency Pedestrian Sidewalk Assessment Process		
081-FH3 Development of Equipment Washers for Invasive Plant Prevention		
¹ 081-FH4 Motorcycle Detection, Classification and Characterization		
081-FH5 Open Source Microscopic Flow Model for Researchers, Universities & Special Projects		
081-*FH6 Low Cost Bridge Structural Monitoring Technology / Turning Structural Monitoring Data into Decision-Making Information		
FEDERAL RAILROAD ADMINISTRATION		6 AWARDS
081-FR1 Compact Autonomous Track Geometry Measurement System		
081-FR2 In-Motion Rail Temperature Measurement Unit		
081-FR3 Non-Contact Distance Measuring Device		
081-FR4 Non-Contact Track Gage Measurement Device		
² 081-FR5 Advanced Parking Brake		
² 081-FR6 Cursory and Non-regulatory Removable Safety Appliances for Intermodal or Semi-Permanently Attached Railcars		
NATIONAL HIGHWAY AND TRAFFIC SAFETY ADMINISTRATION		2 AWARDS
³081-*NH1 Use of Technology for Understanding and Calculating Pedestrian Exposure		

¹ Phase I may be up to \$100,000 and Phase II \$500,000 – Phase II 250,000 lab and field testing

² Phase I may be up to \$100,000 and Phase II \$250,000

³ Phase I may be up to \$100,000 and Phase II \$350,000

⁴081-*NH2 Development of Methods/Technology for Collecting Motorcycle Exposure and Crash Factor Data

PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION

2 AWARDS

081-PH1 Pipeline Safety:

1. Development of Tools for In-field Pipeline Repairs
2. Nanotechnology Tools for Internal Corrosion of Pipelines

081-PH2 *Hazardous Materials:

1. Methods for Transmitting and Transferring Hazardous Material Shipment Information Electronically
2. Improvement of Data Collection from Incidents Involving Hazardous Materials
3. Using Handheld Devices to Assist in Emergency Response to Hazardous Materials Incidents

⁴ Phase I may be up to \$100,000 and Phase II \$500,000

Federal Highway Administration (FHWA)

081-FH1 Balancing Safety and Capacity in an Adaptive Traffic Signal Control System

Several adaptive control systems for signalized intersection networks have been developed, tested, and deployed. The well known systems include the Sydney Coordinated Adaptive Traffic System (SCATS), the Split Cycle Offset Optimization Technique (SCOOT), the adaptive control software-ACS, and the ACS lite - a scaled down version of ACS for arterial traffic management in small to medium communities.

These systems monitor traffic in real time and adjust signal timings based on optimization of traffic delay, travel time, and percent stopped vehicles, etc.

The above systems have documented results in increasing traffic flow speed, reducing stoppage and delay, and increasing intersection throughputs. The algorithms implemented so far are designed to improve efficiency of traffic operations. Nevertheless, network safety of different weighting scales with traffic operations have not been explicitly factored into the decision making process.

This research should identify unsafe traffic conditions in arterial and grid network settings that are likely to cause crashes, and develop algorithms to alleviate such risks using safer adjustments of signal cycles, offsets, phase splits, yellow and clearance intervals, and extension times. These adjustments could be focused or throughout the network. The research should explore and develop means to evaluate network safety and weight costs of potential crashes and delays, and develop algorithms that produces real time network signal timing plans based on optimization of both safety and mobility performances. The contractor would be expected to develop a software that is marketable to all interested parties, State and local governments.

Phase I: To develop a methodology and a work plan for implementation, conduct the analysis, produce the algorithms, and implement network analysis in traffic simulation.

Phase II: To implement the methodology on a limited network and evaluate its performance.

Relationship to FHWA Strategic Objectives

Improve safety, reduce congestion on urban signalized surface streets, and enhance public travel experience.

081-FH2 High Efficiency Pedestrian Sidewalk Assessment Process

The Americans with Disabilities Act (ADA) of 1990 is a Federal Civil Rights Law which prohibits discrimination on the basis of disability. On July 26, 1999, Secretary Rodney Slater issued a U.S. Department of Transportation Accessibility Policy to make accessibility a guiding principle in the development of transportation systems, including pedestrian networks. FHWA produced *Designing Sidewalks and Trails for Access: Part 2, Best Practices Design Guide*, in 2001, to provide guidance on how to plan, design, and construct accessible pedestrian facilities. The *Best Practices Design Guide* also described an idea for a Sidewalk Assessment Process. FHWA issued a Memorandum entitled *Clarification of FHWA's Oversight Role in Accessibility*, in September 2006, calling for increased emphasis on accessible pedestrian facilities, and the requirement for public agencies to develop transition plans under the ADA. However, the lack of an efficient sidewalk assessment process is a significant barrier limiting the ability of localities to develop transition plans that can be used to provide accessible pedestrian facilities.

The 2004 Census indicates that almost 40 million people in the US have disabilities and 23.8 million of those have a physical disability with almost 7 million people using a personal mobility device, such as a wheelchair or scooter. Access to and use of public facilities within the community is essential to fully include and integrate people with disabilities into independent living, family activities, and society. Universally accessible pedestrian facilities benefit all users, and especially increase the independence of

pedestrians with disabilities.

FHWA sponsored DTRS57-01-C-10013 (SBIR 00-FH9) to develop a sidewalk assessment process. The process under development at that time seemed to be too labor intensive and inefficient to be useable, and the contractor was not able to encourage enough localities to participate in a detailed study. With limited SBIR funding in 2002, the Phase 2 proposal did not compete highly enough.

Sensor and computer technology have advanced enough that it is probably now feasible to develop equipment to perform highly efficient sidewalk assessments. People who plan, design, construct, and maintain sidewalks need an efficient and cost effective method to measure elements within the pedestrian environment. A single trained operator should be able to collect and capture data directly into a database for layering into an appropriate Geographic Information System (GIS). Research is needed in Phase I to develop a high efficiency sidewalk assessment process to objectively evaluate the accessibility of sidewalks, curb ramps, bus stops, driveways, and other pedestrian elements. The target cost of this assessment device should be less than \$10,000. It should be operable by one person, to limit staff time needed for assessments.

The following specifications need to be evaluated for access of pedestrian elements: grade, cross slope, obstructions, surface firmness and stability, and clearance widths. Guidelines need to be developed for evaluating sidewalk elements including curb ramps, driveway crossings, roadway medians and islands, bus stops, elevators, lifts, stairways, and sidewalk furniture. Phase I should develop a pedestrian friendly sensor system linked with a database to compile measurements which can be used by State and local transportation planners, engineers, and designers to establish priorities for the construction, reconstruction, and maintenance of pedestrian and roadway elements. The system should be able to assist as a tool for use during the construction process and for making compliance checks after construction. Information on sidewalk grades and other relevant pedestrian information should be made available for signage, mapping, or web accessible formats. The tool also would be useable for ongoing sidewalk system maintenance programs. Phase II should refine and test the system for reproducibility of information with standard manual assessment practices and shall create database software for seamless operation with existing GIS information systems. In addition, training materials should be developed and tested for use of the sensor measurement system with a seamless integration to preferred GIS information systems.

The results of this project will provide planners, engineers, and construction and maintenance crews with methods and tools to obtain objective information that can be used to:

1. Create a standardized record of existing conditions.
2. Monitor changes in conditions over time or from specific interventions.
3. Enhance planning, budgeting, and forecasting for sidewalk costs.
4. Identify and prioritize significant user access barriers or safety concerns.
5. Enhance sidewalk maintenance and construction planning and activities.
6. Educate visitors about the conditions they will encounter.
7. Determine compliance with design specifications.
8. Increase pedestrian access and safety to the community.

Relationship to FHWA Strategic Objectives:

This project promotes safety for all pedestrians while protecting and enhancing the human environment. Pedestrian safety is one of the three focus areas for FHWA's strategic plan for highway safety. Increasing objective access information will enable planners, engineers, and construction and maintenance personnel to provide a safe pedestrian environment for all people, including those with mobility, vision, and/or cognitive impairments. Safe and accessible pedestrian systems may decrease pedestrian crashes.

Increasing independent access within the community will have a positive impact on local economies. In addition, increasing the efficiency of sidewalk assessments will reduce costs.

A high efficiency sidewalk assessment process is necessary to more effectively gather data needed for other kinds of pedestrian studies.

081-FH3 Development of Equipment Washers for Invasive Plant Prevention

Both the Executive Order 13112 of 1999 and the 2005 SAFETEA-LU calls for noxious weed control and/or invasive plant prevention. The issue of invasive plants costs the United States some \$23 billion, annually. Studies now show transportation is a major vector for the spread of these weeds problems. Weeds are particularly spread through State Department of Transportation (DOT) construction and maintenance practices. It is widely agreed among federal agencies that the washing of equipment before movement of mowers, tractors, trucks, etc. to a new site could reduce highway agencies' contribution to this problem significantly. Therefore we suggest that research by a small business could develop precisely the equipment needed to reduce the spread of weeds.

Relationship to FHWA Strategic Objectives:

Expediently cleaning either maintenance or construction equipment before equipment movement is essential. Time is money in both operations. Much of highway corridor work is done by outside contractors which complicates the process. Safety of accomplishing this work within the highway corridor is critical. On-site cleaning will be necessary in a fast-moving context. This application within highway corridors is unique. If we can do it, other land managers will be able to succeed in weed prevention also.

Key Factors:

The product should be 1.) efficient, 2.) effective, and 3.) affordable.

1. The technology must not be time consuming on site or at the show, so as to slow maintenance and/or construction work on highway corridors.
2. The equipment should have been tested to a level of efficacy, to be determined, regarding maximum weed seed allowed after treatment. Before and after comparison testing should be done.
3. Every State DOT District should be able to afford own version of this product.

Phase I Output: Review the literature. Review any related equipment for its efficacy and potential application in highway maintenance and construction work.

The only similar research that might exist is in the Forest Service. If it were ready "for the road", it would not be ready for each of 50 States and all their District offices for both maintenance and construction application. Examine existing knowledge to determine application to State transportation departments.

Phase II Output: Examine market for commercialization for transportation (State, County, and Federal Lands), and other land-managing agencies at the State and Federal levels. Fine tune equipment and field test in different regions of the United States on highway projects and maintenance delivery.

¹081-FH4 Motorcycle Detection, Classification and Characterization

The Motorcycle Travel Symposium held by FHWA and NHTSA has identified motorcycle detection, classification, and characterization as key to enhancing motorcycle safety, motorcycle operations and motorcycle travel estimation. In addition, the FHWA Motorcyclist Advisory Council (MAC-FHWA)

(<http://safety.fhwa.dot.gov/mac/>) has been chartered to look at motorcycle ITS infrastructure issues. Motorcycle fatalities are currently estimated at 30 times those of auto fatalities per Vehicle Mile Traveled (VMT). The objective of this project is to develop an advanced sensor for these applications.

Creation of either new technologies or advanced versions of existing sensor technologies to detect motorcycles, classify them separately and accurately from other vehicles, and to identify different kinds of motorcycles such as: tricycles; heavy touring-class motorcycles; light motorcycles; motor scooters; mopeds; and bicycles is acceptable.

The objective of improving motorcycle safety has two aspects. First, motorcycles must be accurately sensed when approaching ITS control systems traveling by themselves with no other vehicles on the link. This is to assure that they obtain green lights and/or ITS messages important to safety. Second, motorcycles must be accurately sensed, counted, and characterized when traveling in groups of motorcycles or when traveling in mixed traffic so that accurate measurements of motorcycle travel may be made for: (A) VMT measurement purposes; and, (B) congestion mitigation and traffic adaptive control purposes.

Field tests must demonstrate detection of motorcycles/bicycles in a variety of weather/lighting/ “time of day” conditions. Conditions need to include sunrise, sunset, noon, night, sun glare in the Spring and Fall and fog, drizzle, rain and snow. Accuracy must be characterized as the mean values and distributions of hits when a motorcycle is present, misses when a motorcycle is present, correct rejections when not present, false alarms when not present, early measurement of presence before the motorcycle arrives over the sensor area, and late measurement of presence after the motorcycle arrives over the measurement area. Mean values and distributions must be characterized over the different epochs (measurement periods) of interest of one minute, five minutes, fifteen minutes, one hour and twenty-four hours.

Phase I would demonstrate the test and evaluate the potential of a new technology or enhancement of an existing technology. A demonstration of the basic effectiveness of the concept would be conducted at the TFHRC intelligent intersection. Compatibility with the 2070 ATC would be part of this test.

Phase II would develop the enhancement, demonstrate the prototype at the TFHRC intelligent intersection, continue development and then field test it at an intersection capable of generating a variety of weather conditions such as at the Va. Tech Smartroad. It should also be tested at a research intersection with a large number of sensors and technologies such as the Purdue intelligent intersection or the TTI facilities so that the system can be better characterized against the state-of-the-art. Finally, the technology should be evaluated at one or more permanent traffic count stations.

NOTE: The specific technologies for this SBIR have not been specified. More than one award may be made if different technologies with high promise are submitted. Detection, classification and characterization of other vehicle types is still important. Development of a motorcycle only sensor is NOT intended.

Relationship to FHWA Strategic Objectives

Goal: Safety –

Measure: Fatality rate (FY 2007 target is 1.38 per hundred million VMT).

Performance Objective: SF1- Implement comprehensive, integrated and data-driven safety programs at the Federal, State and local level, including State and non-State owned roadway systems.

Comment: This goal requires technology to allow accurate measurement of VMT of motorcycles and bicycles which we CANNOT currently do. Similarly, a key element of intersection safety is assuring that

all motorcycles and bicycles approaching intersections are detected and given an appropriate green so that they do not run the red in frustration. There are problems doing this reliably using current technology.

Goal: Mobility & Productivity

Desired Outcome: Reduce transportation time from origin to destination. Increase the reliability of trip times for the Individual Transportation User.

Comment: For motorcycles and bicycles, this outcome cannot be reached unless they can be reliably detected and classified so that ITS technologies can appropriately respond.

Performance Objective: MP1- Mitigate congestion and improve system reliability through actions targeted at key causes of congestion (VF).

Performance Measures: Number of completed deployments of traffic monitoring systems under Transportation Technology and Innovation

Comment: Again, for motorcycles and bicycles, this outcome cannot be reached unless they can be reliably and ACCURATELY detected, classified and characterized by traffic monitoring systems in all weather and luminance conditions. Existing technologies do not adequately provide these capabilities.

081-FH5 Open Source Microscopic Flow Model for Researchers, Universities & Special Projects

Researchers and Universities need an open source Microscopic Flow Model with both Uninterrupted Flow and Microscopic Flow components based on the Corsim code base for conducting traffic safety research, collision avoidance research and driving simulator research. This research will utilize the source code of both the model and the application programming interface. FHWA has decided to stop directly supporting Corsim and to focus on development of new simulation algorithms. Support for users will be provided by McTrans with their closed source version.

Phase I: Develop prototype open source software to demonstrate the proposer's abilities to modify and enhance the architecture and maintainability of the Microscopic Flow Model based on the same code base as Corsim base.

Phase II: Make the comprehensive changes needed to create an open source version Microscopic Flow Model suitable for the research communities conducting research into collision avoidance, control algorithms and driving simulation. Develop plans for creating and growing an open source research community and providing community support for the research code base.

Areas in which the Interrupted and Uninterrupted Flow Microscopic Models need extension or documentation to facilitate use by the research community include such areas as (1) Documentation of the time step and extension to a variable time step with resolutions down to 0.01 seconds. (2) Enhancement and documentation of the Run Time Extension to allow direct input of all control parameters for a vehicle or set of vehicles from an external source such as a VII or driving simulator and export of all vehicle and control data for either a specified area around a simulator vehicle or for a specified set of vehicles and control elements. (3) Reorganization and documentation of the code in areas most likely to be modified for research applications and modification of the code to compile and execute on Linux under the G95 open source Fortran 95 compiler using the open source multi-platform Phortran/Eclipse IDE. The offeror should present their ideas and approaches to handling R&D needs. (4) Enhancement of the features and capabilities of the vehicle classes to correspond to TEXAS for use on VII and ICM Research (5) Documentation and extension of the origin-destination features to facilitate use of Interrupted Flow Modeling for research with TEXAS and DynaMIT and other models for Integrated Corridor Management and traffic control systems research. (6) Simulation of light rail and heavy rail trains and grade crossings for safety research (7) Addition of a linkage to an open source statistical graphing and plotting package such as gnuplot or DataPlot for producing publication quality research statistics. (8) Investigate incorporation of NGSIM lane changing and car following logic.

The purpose of this project is to enhance the usability of the open source Microscopic Flow Model for research, driving simulation and safety analysis, not for traffic engineering, therefore, the human interface aspects of TSIS are not covered. Similarly, the emphasis is on architectural level changes and changes which facilitate source code utilization in conjunction with other research codes with minimal changes. The vendor would be expected to make revenue by selling services based on modifying the open source Microscopic Flow Models for particular research and driving simulator projects as did for the original developer of Netsim when it was “public domain.”

Note: The contractor will be expected to Trademark the names Interrupted Flow Microscopic Model, (IFMM) Uninterrupted Flow Microscopic Model (UFMM), Interrupted Flow Macroscopic Model and Uninterrupted Flow Macroscopic Model

Relationship to FHWA Strategic Objectives and Vital Few.

Safety *Continually improve highway safety.* This project will significantly increase the performance of simulation systems to interact with safety related research tools such as driving simulators and red light running prevention systems. This will enable systems improvements in the performance of Intersection Collision Avoidance Systems and Red Light Running Prevention Systems by allowing higher quality driving simulator runs simulating these systems.

Mobility *Continually improve the public’s access through ...enhancement of its operations, efficiency, and intermodal connections.* Enhanced interaction of simulation models with external hardware will allow research into advanced signal control, sensing and dynamic messaging. Open Source availability of the Microscopic (Interrupted and Uninterrupted) Flow Model to the research community will create opportunities for research which do not currently exist

Environmental Stewardship & Streamlining *FHWA is committed to protecting and preserving the environment through stewardship and timely reviews.* Addition of vehicle types and characteristics and of light and heavy rail will facilitate comprehensive and timely environmental evaluations of surface street control system and CICAS changes on the environment.

081-FH6 *Low Cost Bridge Structural Monitoring Technology Turning Structural Monitoring Data into Decision-Making Information

Over the past 5 to 10 years, the technology associated with structural monitoring for large infrastructure systems has exploded. A myriad of sensors and systems have been developed, and work is continuing to improve these sensors and systems through the efforts of a range of organizations including academia, industry, and various societies and associations. One deficiency, however, remains with the vast majority of structural monitoring approaches and technologies currently available and being developed – that is, turning the huge amounts of data that are collected into useful decision-making information.

Most structural monitoring sensors and systems currently available or being developed can provide data on either global structural response or local element response. Examples include the range of sensors and systems that provide data on the stress or strain in a component, indicate that a crack has grown larger, or that an element is corroding. However, very little information can be derived from this wealth of data to understand what caused the increase in stress or strain, how significant it is, and what options the facility owner has with respect to addressing the change if it is deemed significant. For example, a large unanticipated strain in a member may be due to a sudden passage of a heavy vehicle, the freezing of a bearing or joint, or a reduction in the cross section of the member due to corrosion or some other factor. Yet, the sensors and systems available today and that are being developed, for the most part, can not tell the owner which of these reasons is the primary cause of the sudden/unexpected increase in strain, and therefore what the response of the owner should be (make an immediate repair, schedule the element or structure for maintenance at some point in the future, or increase load limit enforcement).

There is therefore a huge opportunity to improve the technology for structural monitoring by developing intelligent systems to assess and inform based on the data being reported by these sensors and systems. In the

bridge monitoring arena, this will require integration of the structural monitoring hardware with software and analytical models that accurately predict behavior and can extract from the data sufficient information to identify the primary cause of the change in behavior. In so doing, the technology associated with structural monitoring will make a large advance toward the actual goal of structural “health” monitoring.

Phase I: First, to develop a methodology and a work plan for research and conduct an analysis of alternative intelligent system options for detecting primary causes in structural behavior. Second, to identify a technically feasible strategy for developing a robust intelligent system that can integrate disparate sensor data to enable the pinpointing sources of changes in structural behavior.

Phase II: Develop field usable, empirically-validated intelligent system for integrating sensor data that will enable decision-makers to pinpoint primary sources and causes of changes in structural behavior.

Relationship to FHWA Strategic Objectives:

Since the enactment of SAFETEA-LU in 2005, the FHWA has implemented new programs and developed innovations consistent with its primary strategic goal of improving highway safety. This project will promote increased bridge safety while spinning off potential applications to other modes of surface of transport.

Federal Railroad Administration (FRA)

081-FR1 Compact Autonomous Track Geometry Measurement System

FRA wishes to investigate the possibility of designing a compact non-contact track geometry measurement system. This system should be easily installed on any rail vehicle (locomotive, passenger or freight cars) and measure the track geometry parameters and any deviations from the designed value for gage, left and right profile, left and right alignments, curvature and cross level and warp in accordance to FRA track safety standards. The data should be presented in one foot intervals. In addition, the system should have an integrated Nationwide Differential GPS (NDGPS) / GPS location identification capability. The final version should be able to operate autonomously, have its own power source and detect the track class and report all the exceptions to a central location.

Parameter; range, precision

Distance (miles): 10000, 5ft per mile,

Gage (inches): 55 1/2” to 58 1/2”, 0.0625”

Cross level (inches): ± 10 ”, 0.0625”

Profile (inches): ± 6 ”, 0.0625”

Alignment (inches): ± 7 ”, 0.0625”

Left/right curvature (degrees): ± 20 ”, 0.0625”

Warp (inches): ± 10 ”, 0.0625”

081-FR2 In-Motion Rail Temperature Measurement Unit

FRA would like to determine the feasibility of designing a non-contact rail temperature measurement unit for use on a moving rail vehicle. The unit should be rugged and compact enough to allow for installation on the undercarriage of a typical rail locomotive. The unit may consist of two subunits, one for each respective rail. The unit should be capable of being powered by a standard 110 volt AC source or 72 volt DC source. In operation, the unit should report the temperature of each of the two rails to within ± 2.5 degrees Fahrenheit accuracy at speeds up to 125 miles per hour. Furthermore, all sensors used should be placed at least 12 inches from each respective rail surface and should provide the average rail temperature for the rail section. The unit should be designed to have the capability to display real-time data streams from each of the sensors. GPS hardware components may be incorporated into the system to allow for integrated GPS location identification capability and remote wireless communication of collected data.

081-FR3 Non-Contact Distance Measuring Device

FRA wishes to investigate the possibility of designing a compact non-contact system that can measure distance traveled along the track by the vehicles. In general, most of the measurement systems currently in service, measure the track geometry or rail profile on a distance based measurement system. Most current systems use a tachometer attached to the axle and calculate the distance traveled along the track from the tachometer output and wheel diameter. FRA is wishing to design a non-contact measuring device that can replace tachometer and provide distance traveled along the track at speeds from 0 to 125 mph at 5 feet per mile precision.

081-FR4 Non-Contact Track Gage Measurement Device

FRA wishes to investigate the possibility of designing a non-contact track gage measurement device. This system should be easily installed on any rail vehicle (locomotive, passenger or freight cars) and measure the track gage in accordance to FRA track safety standards. In addition the system should be able to operate in adverse weather conditions (rain, snow) and should not interfere with track components or vehicle operation. The system should be able to collect all the data in both the forward and the reverse move at all speeds up to 125 mph and report the data at one foot interval. The measurement range and accuracy for each channel are as follows: (Gage (inches): 55 1/2" to 58 1/2" Range, 0.0625" Precision).

²081-FR5 Advanced Parking Brake

Situations may arise during switching operations or after an accident or derailment occurs, where the parking brakes on a locomotive or passenger car are disengaged manually to allow movement of the car or consist*. (*when we refer to "consist" we mean 2 or more railcars coupled together) In certain instances, the parking brake air system is compromised and can not provide air pressure to reset the internal fail safe mechanism, thereby inhibiting the intended fail safe application of the parking brakes. When this occurs, the locomotive or car must be chocked to prevent unintentional movement. Chocks can be insufficiently applied to hold the car or consist load. If the car/consist coupler is by-passed or is unintentionally set into motion by an external source, movement can possibly result in dangerous unintentional movement.

The purpose of this SBIR project is to develop a simple, reliable mechanism/component/system to ensure the parking brakes can be reset after the initial loss of air pressure that supplies the parking brake as described above. The mechanism/component/system must be retrofittable onto existing railcar parking brake systems or associated air supply that can be easily adaptable to new locomotives or cars that use the current parking break design. If the proposed mechanism/component/system is external to the locomotive or car parking brake system, then device must be readily transportable to accident sites and allow for simple use by response crews.

The contractor shall conduct a survey of existing parking brake systems and applicable technologies and document the information in a letter report. The contractor shall develop a detailed set of design requirements that clearly describe the form, fit, and function the mechanism/component/system must comply with traditional parking brake and federal requirements to include the Association of American Standards (AAR) and Recommended Practices and/or the American Public Transportation Association (APTA). The contractor shall clearly describe the ranking and selection process to be used to evaluate alternative strategies. The contractor shall then develop a preliminary proof of concept design and demonstrate the functionality of the solution proposed. In the second phase of the SBIR, the contractor must evaluate the prospect of commercialization of the proposed mechanism/component/system.

The contractor must possess knowledge of locomotive and railcar parking brake designs and functionality. Having contacts with operating authority representatives for potential test application is critical.

The information generated in the course of this project shall be summarized and presented in a public forum at the discretion of the Government. The contractor shall also develop a final report describing the methodology, approach, and use of the developed technology.

²081-FR6 Cursory and Non-regulatory Removable Safety Appliances for Intermodal or Semi-Permanently Attached Railcars

Situations arise during transport of Continuous Welded Rail (CWR) Maintenance of Way equipment with traditional couplers where railroad employees at times may have to apply handbrakes while the car is in motion. To do so, railroad employees would need to operate the handbrake and the current handholds above the deck of the flat car provide safe operation of its intended use. The rail movement in a CWR rail train at intermediate locations prohibits the safety appliance placement and thus handholds are removed to allow the transporting of the rail to its destination. Removal of the handholds to transport rail causes the car to be non-compliant, as per 49 CFR 231.6 and as identified in Motive Power and Equipment (MP&E) Technical Bulletins (TB) 98-69 (MP&E 98-69) Safety Appliance Arrangements For Flat Cars and MP&E TB 00-07. After removal of the handholds, the railroad must request a one-time movement from the Federal Railroad Administration in order to move the cars to its destination. At its destination, the railcar must be brought back into compliance by reattaching the safety appliance prior to any movement.

The purpose of this SBIR project is to develop a collapsible or retractable cursory handhold to eliminate the need for a railroad to remove the handholds and provide an enhanced safe operational environment for railroad employees as they perform their duties. The proposed design must be acceptable to the Federal Railroad Administration as an alternate compliant type safety appliance based on the regulations provided in 49 CFR 231 Safety appliance standards, MP&E TB 98-69, MP&E TB 00-07, the requirement for “securely fastened” and railroad employee safety rules for three point protection.

The contractor shall develop a set of design requirements for an advanced handhold device that accomplishes the goals above. A preliminary proof of concept design shall be developed and demonstrated. The contractor must also evaluate the prospect of commercialization of the proposed device. The contractor must possess knowledge of railcar Safety appliance standards as it pertains to the Federal regulation, railroad safety and operating safety rules, practices, and standards. The information generated in the course of this project shall be summarized and presented in a public forum at the discretion of the Government. The contractor shall also develop a final report describing the methodology and approach used to develop the technology.

National Highway Traffic Safety Administration (NHTSA)

³081-NH1 *Use of Technology for Understanding and Calculating Pedestrian Exposure

The current lack of exposure data makes it extremely difficult to understand changes in pedestrian crash rates. These changes could be due to simple increases or decreases in exposure or to a myriad other factors (changes in congestion, infrastructure, or age of pedestrians). The inability to clearly separate out the relevant factors contributing to pedestrian fatalities inhibits our ability to design effective countermeasure programs to reduce pedestrian crashes.

Pedestrian exposure is difficult to capture because it can be defined in a number of ways. For instance, exposure can be defined as number of streets crossed, time spent walking near streets, or distance traveled near streets. There is also controversy over what type of trip should be counted. Exposure can include walking to a mailbox, walking in a parking lot, a walking trip that begins and ends at the same location, etc. In addition, one may want to measure walking, but that may not provide exposure to traffic and consequently risk of a crash. In order to understand pedestrian crash risk, exposure will be defined as any situation in which a pedestrian is at risk for being hit by a vehicle on public roads (fatalities included in NHTSA’s Fatality Analysis Report System only include crashes that occur on public roads).

The goal of this study is to develop the technology and test the methodology for using technology to estimate pedestrian exposure in a pilot test. One possible technology is a GPS tracker, but there may be others. Phase I of the study will be devoted to identifying technological systems that a person could easily carry and that capture details such as exact location on a map (i.e., walking next to a street and most likely on a sidewalk or path) to ascertain if the pedestrian is exposed to a traffic risk, or just walking. Phase I would also develop strategies to ensure that the technology would be worn most of the time by participants and is easy to use. Finally, because exposure can be defined several different ways, this project will use mathematical modeling that will incorporate various factors (time walked, distance walked, number of streets walked, etc.) to estimate exposure. The outcomes of Phase I are to determine:

- 1) The feasibility of using technology to identify various types of walking trips;
- 2) How walking trips will be identified;
- 3) The types of information that each technology device collects;
- 4) The software needed to record and store the data for later analyses;
- 5) The mathematical models needed to estimate exposure;
- 6) The ease of use of different technology systems for participants; and if the technology is viable,
- 7) The proposed methodology for a pilot study in Phase II which includes strategies to ensure participants have their trackers for a specified time period during data collection.

All of these outcomes in Phase I would be described in a final report.

If technology exists to estimate pedestrian exposure, the project would move to Phase II. A pilot study will be conducted in Phase II which develops the methodology of using technology to estimate pedestrian exposure. Phase II shall recruit participants at one site, capture exposure data from each participant for a predetermined period of time, and record, store, and analyze the data using mathematical models to estimate pedestrian exposure. Bidders are encouraged to discuss sampling plans and how to determine the ideal timeframe that participants should wear technology device. For instance, would a wearing a device (e.g., GPS tracker) for one randomly selected week more than likely capture the typical pedestrian exposure? Would it take one month to get a more reliable estimate of annual pedestrian exposure? Bidders should also discuss the logistics of carrying out such a pilot study and how they would select a site. The outcomes of Phase II include a final report which discusses in detail the study methodology, analyses and results, and discusses the feasibility of conducting a large-scale, nationwide study in the future.

4081-NH2 *Development of Methods/Technology for Collecting Motorcycle Exposure and Crash Factor Data

Recently, the Department of Transportation released an *Action Plan to Reduce Motorcycle Fatalities* (DOT HS 810 855, 2007) in response to the dramatic increase in motorcycle fatalities over the last 10 years. Motorcycle fatalities are 11% of all motor vehicle fatalities despite the fact that motorcycles are approximately 2% of all registered vehicles. The greatest increases in motorcycle operator fatalities have occurred among older motorcycle operators ages 40 and over. A majority of these older motorcyclists were riding large engine motorcycles (1001-1500cc). While we know the characteristics of fatal motorcycle crashes, we do not understand the causes. Our inability to clearly separate out the relevant factors contributing to the recent rise in motorcycle fatalities inhibits our ability to design effective countermeasure programs to reduce motorcycle crashes.

One basic lack of data is vehicle miles traveled (VMT). It would be helpful to have a simple-to-use device or method to record motorcycle vehicle miles traveled and thus get a better measure of exposure for motorcycle riders. Another data gap is a lack of understanding of the factors contributing to motorcycle crashes. One way to address this data gap is to explore the feasibility of outfitting motorcycles with technology (for example data recorders) to record speed, distance, locations traveled, time of day, day of week, crashes, near misses (if feasible), etc. While similar technology exists for vehicles, it was not

possible in the past to outfit a motorcycle due to the size of the data recording equipment. Phase I will address two activities: (1) identify and develop a method or technology to obtain a measure of motorcycle vehicle miles traveled; and (2) identify a technology that can be developed to obtain better information about the factors contributing to motorcycle crashes. The acceptability of any such technology will also have to be explored. The first activity has implications for commercial use, while the second activity will be useful as a research tool. Bidders are encouraged to discuss strategies to identify methods and technology for collecting VMT data, as well as technology for collecting more comprehensive data on factors related to motorcycle crashes. If no existing technology exists, bidders are encouraged to develop prototype devices, as appropriate. The outcome of Phase I will be a final report detailing (1) available methods and technology for collecting VMT data and for collecting data on the factors associated with motorcycle crashes; (2) if none exist, specify a prototype devices for collecting the above data; (3) identification and discussion of the software needed to record and store the data; and (4) discussion of feasibility and acceptability issues.

If technology and methods exist or can be developed to collect motorcycle VMT data or to outfit motorcycles with technology to collect data on crash factors, the project would move to Phase II. Phase II would be an effort to further develop and test the technology or methods, including a small-scale pilot test. The objectives of Phase II are to (1) develop and refine any proposed technology and methods; (2) test the methodology and technology for collecting the relevant data (e.g., VMT, factors associated with crashes); (3) conduct a small pilot study to collect VMT data and to outfit a small number of motorcycles with technology to collect information related to motorcycle crashes. The outcomes of Phase II are to determine (1) if the technology and/or methods for collecting the relevant data are feasible; (2) the extent to which data can be collected, stored and managed; and (3) the extent to which motorcycle riders volunteer to participate in a research study. These outcomes would be included in a final report detailing the extent to which a full-scale study is feasible, and if feasible, describe the most efficient methodology for a full-scale study.

Pipeline and Hazardous Materials Safety Administration (PHMSA)

081-PH1 Pipeline Safety:

America receives over two-thirds of the crude and petroleum products for more than 55 million residential and commercial customers, through more than 170,000 miles of Hazardous Liquid pipelines (based on year 2007 liquid pipeline operator national mileage information). In addition, over 295,000 miles of gas transmission pipeline transport natural gas to local companies that distribute it through over 1,900,000 miles of pipelines to local customers. This supply of energy has too often been disrupted by pipeline leaks. In addition, damage from excavation is the leading cause for in-field utilities disruption.

For Pipeline Safety, research is sought on the use of innovative tools or concepts that allow for pipeline detection of internal corrosion; defect remediation, repair and or mitigation on both hazardous liquid and or natural gas pipelines.

Areas of interest include but are not limited to:

1. Development of tools for In-field pipeline repairs

In-field repair of a damaged pipeline must be performed safely, efficiently, rapidly, and reliably. Reinforcement of damaged pipelines is typically accomplished by welding a repair patch and then recoating the repaired area. The welded full-encirclement sleeve is still the most common repair system due to the lower risk, potential cost savings, and simplicity of the repair. Recent developments in fiber reinforced composite repair patches have led to their increased usage across other industries. A composite repair offers an alternative to welding as the strength is claimed to be comparable. The pipeline surface

conditions are also likely to play a role in the long term performance of the composite patch but exactly to what extent is unclear. Currently there are no recommended practices for the use of fiber reinforced composite repair patches in the natural gas and or hazardous liquids industry.

Applications are sought to study, develop and demonstrate new repair techniques for Transmission and or Distribution Pipelines. Anticipated results would provide data in support of long term performance and or recommended method/practices for their application.

2. Nanotechnology tools for Internal Corrosion of Pipelines.

Nanotechnology is the understanding and control of matter at dimensions of roughly 1 to 100 nanometers, where unique phenomena enable novel applications. Encompassing nanoscale science, engineering and technology, nanotechnology involves imaging, measuring, modeling, and manipulating matter at this length scale. Nanotechnology is advancing rapidly in several other technology applications.

Determining the presence and corrosivity of water is an important component of Internal Corrosion Direct Assessment (ICDA) in the pipeline industry. Current available technologies are limited because some cannot be applied to all pipelines and others require prior knowledge of where to locate the sensors and costly pipeline excavations to emplace the sensors.

Applications are sought for new nanotechnologies for detection and elimination of internal corrosive compounds, and or providing assessment information that could compare product composition. Anticipated results would provide quantifiable and reliable improvements in ICDA. Applications are sought to study, develop and demonstrate nanotechnologies or techniques towards pipeline internal corrosion.

081-PH2 *Hazardous Materials:

Hazardous materials are essential to the economy of the United States and the well-being of its people. Hazardous materials fuel automobiles, heat and cool homes and offices, purify water supplies, and are used for farming and medical applications and in manufacturing, mining, and other industrial processes. More than 3 billion tons of regulated hazardous materials – including explosive, poisonous, corrosive, flammable, and radioactive materials – are transported in this country each year. There are over 800,000 daily shipments of hazardous materials moving by plane, train, truck, or vessel in quantities ranging from ounces to thousands of gallons.

1. Methods for Transmitting and Transferring Hazardous Material Shipment Information Electronically

PHMSA is investigating the feasibility of promoting and authorizing the use of electronic documentation and information sharing associated with Electronic Freight Management (EFM) initiatives to provide the necessary safety information and hazard communication requirements related to the transportation of hazardous materials (HM). Transportation industry organizations are expressing the need to expand EFM technologies based upon the growing level of container imports and the tightening of the supply chain. There is an ever increasing interest from a broad group of stakeholders, some of which are operating in just-in-time manufacturing and delivery environments, in order enhance productivity and efficiency relative to HM transport. Delays in cargo delivery due to errors in shipping papers or the need to generate different documentation for each delivery mode can cause significant impacts to just-in-time operations. Research is needed in order to determine effective systems which would enable EFM and promote the clear and accurate communication of shipment information between shippers, carriers, and receivers as well as emergency response personnel and applicable inspectors.

2. Improvement of data collection from incidents involving hazardous materials.

Geospatial information can be a valuable tool in evaluating hazardous materials incidents in terms of evacuations and material dispersions; assessing risks associated with hazardous materials commodity flows and transportation corridors; identifying high hazard areas and critical infrastructure and their proximity to emergency response assets and facilities; and planning exercises and drills to evaluate local response plans. Research is needed to determine the accuracy and tolerances for hazardous materials transportation geospatial data to be useful in supporting the evaluations, assessments, and planning actions noted above as well as other activities.

3. Using Handheld Devices to Assist in Emergency Response to Hazardous Materials Incidents

Explore ways to link electronic GPS Navigation systems and devices to protective action distances provided in the Mobile ERG to assist first responders in determining evacuation/protective action areas, identifying detours around the protected/incident areas, and rerouting/notifying the public immediately through the traffic radio services already available to users of such navigation systems. These portable mobile systems are becoming more sophisticated, experiencing significant growth in usage by drivers and the traveling public, and soon will likely be common equipment in many vehicles. Developing and linking these systems could: 1. help protect the first responders, 2. protect the traveling public, and 3. reduce congestion through immediate rerouting/detours to keep the flow of traffic moving during mitigation and clean up of hazmat incidents.

VIII. SUBMISSION FORMS AND CERTIFICATIONS

- | | | |
|----|---|------------|
| 1. | PROPOSAL COVER SHEET | Appendix A |
| 2. | PROJECT SUMMARY | Appendix B |
| 3. | CONTRACT PRICING PROPOSAL | Appendix C |
| 4. | PROPOSAL CHECKLIST
(do not include with your proposal – for your use only) | Appendix D |

**U.S. DEPARTMENT OF TRANSPORTATION
SMALL BUSINESS INNOVATION RESEARCH PROGRAM
SOLICITATION NO. DTRT57-08-R-SBIR**

PROPOSAL COVER SHEET

Project Title _____

Research Topic No. _____ Research Topic Title _____

Submitted by: Name _____

Address _____

City _____ State _____ Zip + _____

Amount Requested (Phase I) \$ _____
(May be up to \$100,000 unless otherwise indicated)

Proposed Duration _____
(in months) (Not to exceed six months)

1. The above concern certifies it is a small business firm and meets the definition stated in Section II.B; and that it meets the eligibility requirement in Section I.C. Yes _____ No _____
2. The above concern certifies it _____ does _____ does not qualify as a socially or economically disadvantaged small business as defined in Section II.C. (For statistical purposes only.)
3. The above concern certifies it _____ does _____ does not qualify as a women-owned small business as defined in Section II.D. (For statistical purposes only.)
4. This firm and/or Principal Investigator has submitted proposals containing a significant amount of essentially equivalent work under other federal program solicitations, or has received other federal awards containing a significant amount of essentially equivalent work. (If yes, identify proposals in the Section III. D.10. "Similar Proposals or Awards".) Yes _____ No _____
5. Will you permit the Government to disclose the title and technical abstract of your proposed project, plus the name, address, and telephone number of the Corporate/Business Official and Principal Investigator of your firm, if your proposal does not result in an award, to any party that may be interested in contacting you for further information? Yes _____ No _____
6. Do you qualify as a HUBZone-owned and meet the definition as stated in this Section II. F (For statistical purposes only) Yes _____ No _____

Principal Investigator
Name _____
Title _____
Signature _____ Date _____
Telephone No. _____

Corporate/Business Official
Name _____
Title _____
Signature _____ Date _____
Telephone No. _____

PROPRIETARY NOTICE (IF APPLICABLE, SEE SECTION V.D.1)

**U.S. DEPARTMENT OF TRANSPORTATION
SMALL BUSINESS INNOVATION RESEARCH PROGRAM
SOLICITATION NO. DTRT57-08-R-SBIR**

PROJECT SUMMARY

Name and Address of Offeror	FOR DOT USE ONLY
	Proposal No.

Name and Title of Principal Investigator

Project Title

Research Topic No.	Research Topic Title
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Technical Abstract (Limited to two hundred words in this space only with no classified or proprietary information/data).

Anticipated Results/Potential Commercial Applications of Results.

Provide key words (eight maximum) description of the project useful in identifying the technology, research thrust, and/or potential commercial application.

**U.S. DEPARTMENT OF TRANSPORTATION
SMALL BUSINESS INNOVATION RESEARCH PROGRAM
SOLICITATION NO. DTRT57-08-R-SBIR**

**APPENDIX C
(SCHEDULE 1)**

CONTRACT PRICING PROPOSAL

PROPOSAL COVER SHEET				1. SOLICITATION/CONTRACT/MODIFICATION NUMBER			
2a. NAME OF OFFEROR				3a. NAME OF OFFEROR'S POINT OF CONTACT			
2b. FIRST LINE ADDRESS				3b. TITLE OF OFFEROR'S POINT OF CONTACT			
2c. STREET ADDRESS							
				3c. TELEPHONE		3c. FACSIMILE	
2d. CITY	2e. STATE	2f. ZIP CODE		AREA CODE	NUMBER	AREA CODE	NUMBER
4. TYPE OF CONTRACT OR SUBCONTRACT <i>(Check)</i> <input checked="" type="checkbox"/> FFP <input type="checkbox"/> CPFF <input type="checkbox"/> CPIF <input type="checkbox"/> CPAF <input type="checkbox"/> FPI <input type="checkbox"/> OTHER <i>(Specify)</i>				5. <input type="checkbox"/> PRIME OFFEROR <input type="checkbox"/> SUBCONTRACTOR _____ <div style="text-align: right;">PRIME OFFEROR'S NAME</div>			
6. ESTIMATED COST, FEE, AND PROFIT INFORMATION							
A. ESTIMATED COST							
B. PROFIT							
C. TOTAL PRICE							
7. PROVIDE THE FOLLOWING							
NAME OF COGNIZANT CONTRACT ADMINISTRATIVE AGENCY				NAME OF COGNIZANT GOVERNMENT AUDIT AGENCY			
STREET ADDRESS				STREET ADDRESS			
CITY	STATE	ZIP CODE		CITY	STATE	ZIP CODE	
TELEPHONE	AREA CODE	NUMBER		TELEPHONE	AREA CODE	NUMBER	
FACSIMILE	AREA CODE	NUMBER		FACSIMILE	AREA CODE	NUMBER	
NAME OF CONTACT				NAME OF CONTACT			
PROPERTY SYSTEM <input type="checkbox"/> Reviewed by cognizant contract administrative agency and determined acceptable <input type="checkbox"/> Reviewed by cognizant contract administrative agency and determined not acceptable <input type="checkbox"/> Never reviewed				APPROXIMATE DATE OF LAST AUDIT			
				PURPOSE OF AUDIT <div style="text-align: right;">(e.g. proposal review, establishment of billing rates, finalize indirect rates, etc.)</div>			
				ACCOUNTING SYSTEM <input type="checkbox"/> Audited and determined acceptable <input type="checkbox"/> Audited and determined not acceptable <input type="checkbox"/> Never audited			
PURCHASING SYSTEM <input type="checkbox"/> Reviewed by cognizant contract administrative agency and determined acceptable <input type="checkbox"/> Reviewed by cognizant contract administrative agency and determined not acceptable <input type="checkbox"/> Never reviewed				OFFEROR'S FISCAL YEAR			
8a. NAME OF OFFEROR <i>(Typed)</i>				9. NAME OF FIRM			
8b. TITLE OF OFFEROR <i>(Typed)</i>							
10. SIGNATURE					11. DATE OF SUBMISSION		

**U.S. DEPARTMENT OF TRANSPORTATION
SMALL BUSINESS INNOVATION RESEARCH PROGRAM
CONTRACT PRICING PROPOSAL**

Background

The following items, as appropriate, should be included in proposals responsive to this Solicitation.

Cost Breakdown Items (in this order, as appropriate) (See Section III.E)

1	Name of offeror		
2	Address of offeror		
3	Location where work will be performed		
4	Offeror's Project Title		
5	Research topic number and title from DOT SBIR Program Solicitation		
6.	Total Proposal Amount		\$ <input type="text"/>
7.	Direct Material Costs		
	a. Purchased Parts		\$ <input type="text"/>
	b. Subcontracted Items		\$ <input type="text"/>
	c. Other		\$ <input type="text"/>
	(1) Raw Materials		\$ <input type="text"/>
	(2) Standard Commercial Items		\$ <input type="text"/>
	Total Direct Materials (TDM)		\$ <input type="text"/>
8.	Material Overhead (TDM x Rate %)		
		Rate	Amount
	Total Material Overhead (TMO)	<input type="text"/> %	\$ <input type="text"/>
9.	Total Materials (TDM + TMO)		
			\$ <input type="text"/>
10	Direct Labor		
	Type / Personnel	Hours	Rate (\$ / Hr) Cost
			\$ <input type="text"/>
			\$ <input type="text"/>
			\$ <input type="text"/>
	Total Direct Labor (TDL)		\$ <input type="text"/>
11.	Labor Overhead (TDL x Overhead Rate)		
		Rate	Amount
	Total Labor Overhead (TLO)	<input type="text"/> %	\$ <input type="text"/>
12.	Labor: Fringe Benefits (TDL x Benefit Rate)		
		Rate (% or \$ / Hr)	Amount
	Fringe Benefits	<input type="text"/>	\$ <input type="text"/>
13.	Total Labor (TDL + TLO + Fringe)		
			\$ <input type="text"/>
14	Direct Costs: Special Testing (Include field work at Government installations)		
	Item & Anticipated Use	Unit Cost	Estimated Cost
			\$ <input type="text"/>
			\$ <input type="text"/>
			\$ <input type="text"/>

					\$		
	Estimated Total Special Testing					\$	
15.	Direct Costs: Special Equipment						
	Item & Anticipated Use			Unit Cost	Amount		
					\$		
					\$		
					\$		
	Estimated Total Special Equipment					\$	
16	Direct Costs: Travel						
	Travel Location	Mode of Travel	# of Trips	Per Diem	Amount		
					\$		
					\$		
	Travel					\$	
17	Direct Costs: Consultant Services						
	Description of Service					Amount	
						\$	
						\$	
	Total Consultant Services					\$	
18	Direct Costs: Other Direct Costs (ODC) not previously accounted for.						
	Item & Anticipated Use			Unit Cost if applicable	Amount		
					\$		
					\$		
					\$		
	Total Other Direct Costs					\$	
19	Total Direct Costs (TDC) (Sum of Line No. 14 – 18)					Amount	
						\$	
20	General & Administrative Expense ((Total Materials + Total Labor + Total ODC) x Rate)						
				Rate %	Amount		
					\$		
21	Royalties						
	Description					Amount	
						\$	
	Total					\$	
22	Total Cost (Sum of lines 9, 13, 19, 20 & 21)					Amount	
						\$	
23	Profit (Total Cost x Profit Rate)						
				Rate %	Calculated Amount		
					\$		
24	Total Firm Fixed Price Amount (Total Cost + Profit)			\$			
25	THE COST BREAKDOWN PORTION OF A PROPOSAL MUST BE SIGNED BY A RESPONSIBLE OFFICIAL OF THE FIRM. (INCLUDE TYPED NAME AND TITLE AND DATE OF SIGNATURE IN THE SPACE PROVIDED ON THE COVERPAGE OF THIS PROPOSAL)						
26	Provide a yes or no answer to each of the following questions:					(Yes / No)	
	Has any executive agency of the United States Government performed any review of your accounts or records in connection with any other Government prime contract or subcontract within the past twelve months? If yes, provide the name and address of the reviewing office, name of the individual and telephone/extension below						

	Will you require the use of any Government property in the performance of this proposal? If yes, identify. <hr/> <hr/>	
	Do you require Government contract financing to perform this proposed contract? If yes, specify type as advanced payments or progress payments. <hr/> <hr/> <hr/>	
27	Type of contract proposed is, <u>firm-fixed price</u>	
28	DUNS number, if available _____ (See Section III.F)	
29	Tax Identification Number, if available _____	

**U.S. DEPARTMENT OF TRANSPORTATION
SMALL BUSINESS INNOVATION RESEARCH PROGRAM
SOLICITATION NO. DTRT57-08-R-SBIR
PROPOSAL CHECKLIST**

This is a CHECKLIST OF REQUIREMENTS for your proposal. Please review the checklist carefully to assure that your proposal meets the DOT SBIR requirements. Failure to meet these requirements may result in your proposal being returned without consideration. (See Sections III of this Solicitation). **Do not include this checklist with your proposal.**

- _____ 1. The proposal reflects the fact that for Phase I a minimum of two-thirds (and for Phase II a minimum of one-half) of the research and/or analytical effort will be performed by the proposing firm as required (see Sections V.H.1 and V.H.2) and the primary employment of the principal investigator (for both Phase I and Phase II) must be with the small business firm at the time of award and during the conduct of the proposed research as required (see Section I.C).
- _____ 2. The proposal is 25 PAGES OR LESS in length. This limitation does not apply to the additional information required by Section III.H.
- _____ 3. The proposal is limited to only ONE of the research topics in Section VIII.
- _____ 4. The proposal budget may be up to \$100,000 unless otherwise indicated and duration does not exceed six months.
- _____ 5. The technical abstract contains no proprietary information, does not exceed 200 words, and is limited to the space provided on the Project Summary sheet (Appendix B).
- _____ 6. The proposal contains no type smaller than ten point font size.
- _____ 7. The COVER SHEET (Appendix A) has been completed and is PAGE one of the proposal.
- _____ 8. The PROJECT SUMMARY (Appendix B) has been completed and is PAGE two of the proposal.
- _____ 9. The TECHNICAL CONTENT of the proposal begins on PAGE three and includes the items identified in SECTION III.D of the Solicitation.
- _____ 10. The Contract Pricing Proposal (Appendix C) has been included as the last section of the proposal.
- _____ 11. The additional information on prior Phase II awards, if required, in accordance with Section III.H.
- _____ 12. The proposal must be a PDF file and submitted online by 5 p.m., June 3, 2008.
Proposals may only be submitted online, a link to the web form can be found here:
<http://www.volpe.dot.gov/sbir/current.html>. Instructions are included on the submission page.